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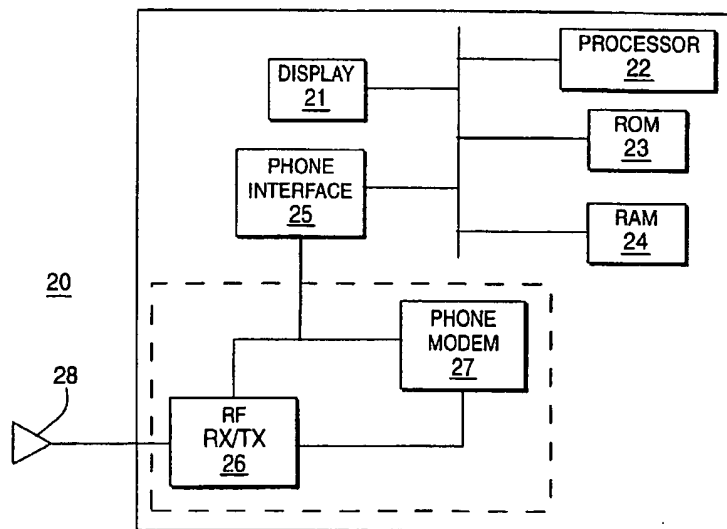
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: A CELL PHONE WITH SCHEDULED-BASED SUPPRESSION OF A NOTIFICATION OF AN INCOMING CALL



(57) Abstract: A cell phone includes a radio frequency transceiver (26) coupled to an antenna (28), a phone modem (27) coupled to the transceiver; a phone interface (25) coupled to the phone modem and transceiver; and a display (21), processor (22), read only memory ROM (23) and random access memory RAM (24) each coupled to the phone interface. The ROM and RAM memory is configured to permit scheduled suppression of a notification of a call received over the antenna.

**A CELL PHONE WITH SCHEDULED-BASED
SUPPRESSION OF A NOTIFICATION OF AN INCOMING CALL**

Technical Field

5 This disclosure relates to cell phones, and more particularly, to a cell phone with a schedule-based suppression of a notification of an incoming call.

Description of the Related Art

10 A typical incoming call notification on a cell phone is an audible alert such as ringing. The user will often have to turn off the cell phone or disable the ringer during meetings, classes, and other time periods when the call notification or audible would be disturbing.

 The user must manually disable the phone just before the period during which call notification, such as ringing, is to be disabled.

15 Therefore, a need exists for a cell phone that would remain on during periods when a notification of an incoming call suppressed.

SUMMARY OF THE INVENTION

20 A cell phone includes a radio frequency transceiver coupled to an antenna, a phone modem coupled to the transceiver; a phone interface coupled to the phone modem and transceiver; and a display, processor, read only memory ROM and random access memory RAM each coupled to the phone interface. The ROM and RAM memory is configured to permit scheduled suppression of a notification of a call received over the antenna.

25 Alternatively, a method for schedule based suppression on a cell phone of a notification of a call received includes the steps of entering on a cell phone interface a starting period for a scheduled suppression of a call notification, entering on the cell phone interface an ending period for the scheduled suppression, and entering a status enabling the cell phone to suppress notification of a call received by the cell phone for the duration from the starting period to the ending period.

30

BRIEF DESCRIPTION OF DRAWINGS

This disclosure will present in detail the following description of preferred embodiments with reference to the following figures wherein:

FIG. 1 is a block diagram of a calendar interface display on a cell phone in accordance with the present invention;

FIG. 2 is a block diagram of a cell phone architecture for implementing the present invention;

FIG. 3 is a block diagram of an exemplary calendar data structure in accordance with the present invention;

FIG. 4 is a flow diagram of an exemplary calendar process in accordance with the present invention;

FIG. 5 is a flow diagram of an exemplary phone process in accordance with the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

A cell phone user will typically have to turn off his phone or disable his ringer during meetings, classes, and other time periods when he does not wish to be disturbed. This invention would allow the user to keep his phone on during these meetings and not be disturbed.

The present invention involves the use of a cell phone that has PDA capabilities such as a calendar. When the user enters an appointment in the calendar he will have an option to configure the appointment so the ringer on the phone is muted. If a phone call comes in during the scheduled time of a Do Not Disturb appointment, the phone will not ring and the call will be routed directly to voice mail. Other options include telling the phone to vibrate instead of not ringing during certain appointments.

Referring now in specific detail to the drawings in which like reference numerals identify similar or identical elements throughout the several views, and initially to FIG. 1, a block diagram of a calendar interface display 10 on a cell phone.

Minimally, the display interface 10 would show and permit entry of a start date and time 11, an end date and time 12 and status 13. The exemplary busy status 13 shown can be for a condition when an incoming call is received the call notification or a ringing is suppressed during the start period to the end period.

An exemplary cell phone hardware architecture 20 is shown in block form in FIG.

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2. The display 21, processor 22, ROM 23, RAM 24 and phone interface 25 can be interconnected over a bus 29. The phone interface 25 is coupled to the modem 27 and radio frequency RF receiver and transmitter 26 tied to the antenna 28.

5 Referring to an exemplary memory allocation structure for a calendar interface display, a pointer in memory 31 can point to a previous calendar entry (not shown), a current appointment 33, and the next entry 32 that would point or reference to its own current appointment description structure 34.

Referring now to FIG. 4, an exemplary flow diagram 40 illustrates a section of code which interprets appointments from the calendar data structure 20. When the operating system
10 calls the calendar process, this section of code is executed. First the time of the next appointment entry in the calendar linked list is compared with the system clock 41. If it is time for an appointment, an appointment is added to an active appointment list 42. The active appointment list is a linked list similar to the calendar data structure lists 30, except that only active appointments are on the list. The active appointment list points to description structures
15 34 of only active appointments. Then the pointing is directed to the first active appointment on the active appointment list in block 43. Any operations necessary for that appointment are done 44. This would include setting up any phone related parameters as instructed in the appointment description structure. If the appointment indicates no calls, information is written in a shared area of memory for the phone process to read which will tell the phone process to not ring the
20 phone.

Other parameters can be included in the appointment, enabling such features as follows: ring as normal operation, ring only if person calling is on priority list, ring only if a specific number calls, vibrate instead of ring, provide a special voice prompt and take a message locally on the phone, etc. Block 44 causes transfer of appointment related phone control to be
25 transferred to the phone control process. A check is made to determine if the current appointment is over 45. If the current appointment is over, it is removed from the active appointment list, and phone control parameters in the shared memory are restored to defaults 46. The active appointment pointer is adjusted to the next active appointment 44. If all active appointments have been checked 48, then the routine returns to the operating system. If multiple
30 concurrent appointments have different phone suppression levels, the strongest level is used, i.e., "Do Not Disturb" is stronger than vibrate on a priority list. This bit of code 40 is part of the calendar program, called when the operating system runs a calendar program thread.

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The flow diagram 50 of FIG. 5 illustrates the operation of the phone control process. First, the process decides whether appointment properties have been activated in the shared memory by the calendar program thread. If there are not appointment based changes in call handling, the process decision 51 allows the call to be processed as usual 52, based on whatever the default ring properties the user has established for the phone. If there are appointment based phone control features enabled, then the process parses the features in the following path of decisions starting with 53. If the appointment calls for no ring, then the ring feature on the phone is disabled 54, and the phone process is allowed to continue as usual. If no ring selection 53 was true, the voice mail service at the service provider's office would pick up the call.

When the appointment only allows calls from priority numbers or names to be allowed, the decision 55 passes control to decision 56, which waits for caller ID. If caller ID is available, the received caller ID number or name is checked against the priority list in decision 58. If the name or number is on the list, then the phone will ring and control will pass to continue processing the call in 60. Otherwise, if caller ID is not available in decision 56, or if the name or number is not available in decision 58, ring will be suppressed in 57 or 59, respectively, and the call control will continue as usual, allowing system voice mail to pick up the call.

When the appointment allows calls only from a special list, decision 61 passes control to decision 62, where caller ID is checked. If caller ID is available, the received caller ID name or number is checked with the special list of names or numbers in decision 66. If the name or number was on the special list, the phone is allowed to ring, and control is passed to continue processing the call in 68. If caller ID is not available, or if the incoming name or number is not on the special list, the phone will not ring, and the call process will continue from 63 or 67 respectively, allowing the system voice mail to answer the call. If the appointment calls for vibrate to announce calls, decision 64 will allow the phone to vibrate rather than ring, and pass the control to continue processing the call in 65. Finally, other options could be parsed based on appointment based phone control selections, by adding more options to the parsing tree, including things like auto-answer with a special message, answer the call using local memory for answering machine storage, or other functions. This bit of code 50 would be among the first functions executed when the phone received an incoming call, before the user was alerted to the incoming call.

Having described preferred embodiments for cell phone notification suppression (which

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are intended to be illustrative and not limiting), it is noted that modifications and variations can be made by persons skilled in the art in light of the above teachings. It is therefore to be understood that changes may be made in the particular embodiments of the invention disclosed which are within the scope and spirit of the invention as outlined by the appended claims.

5 Having thus described the invention with the details and particularity required by the patents laws, what is claimed and desired protected by Letters Patent is set forth in the appended claims.

CLAIMS:

1. A cell phone comprising:
a radio frequency transceiver (26) coupled to an antenna (28),
a phone modem (27) coupled to the transceiver;
5 a phone interface (25) coupled to the phone modem and transceiver; and
a display (21), processor (22), read only memory ROM (23) and random access memory
RAM (24) each coupled to the phone interface, said ROM and RAM memory configured to
permit scheduled suppression of a notification of a call received over the antenna.
2. The cell phone as recited in claim 1, wherein the display shows the scheduled
10 period when the notification of the call is suppressed.
3. The cell phone as recited in claim 1, wherein the display shows a data structure
stored in RAM comprising a starts entry, an ends entry and a status entry.
4. The cell phone recited in claim 1, wherein the notification of a call received is an
audible comprising one of a ringing and vibration.
- 15 5. The cell phone as recited in claim 1, wherein the phone interface permits user
entry of the scheduled suppression of the notification of a call on a calendar basis.
6. The cell phone as recited in claim 1, wherein the cell phone comprises a personal
digital assistant and features for a calendar based scheduling of call notification suppression.
7. A method for schedule based suppression on a cell phone of a notification of a
20 call received, comprising the steps of:
entering on a cell phone interface a starting period (11) for a scheduled suppression of a
call notification;
entering on the cell phone interface an ending period (12) for the scheduled
suppression, and
25 entering a status (13) enabling the cell phone to suppress notification of a call
received by the cell phone for the duration from the starting period to the ending period.
8. The method of claim 7, further comprising the step of notifying a voice mail
server to take the call received when the cell phone is on the scheduled suppression.
9. The method of claim 7, wherein the starting period comprise a calendar date and
30 time.
10. The method of claim 9, wherein the ending period comprises a calendar date and
time.

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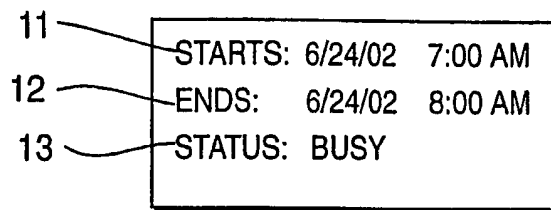


FIG. 1

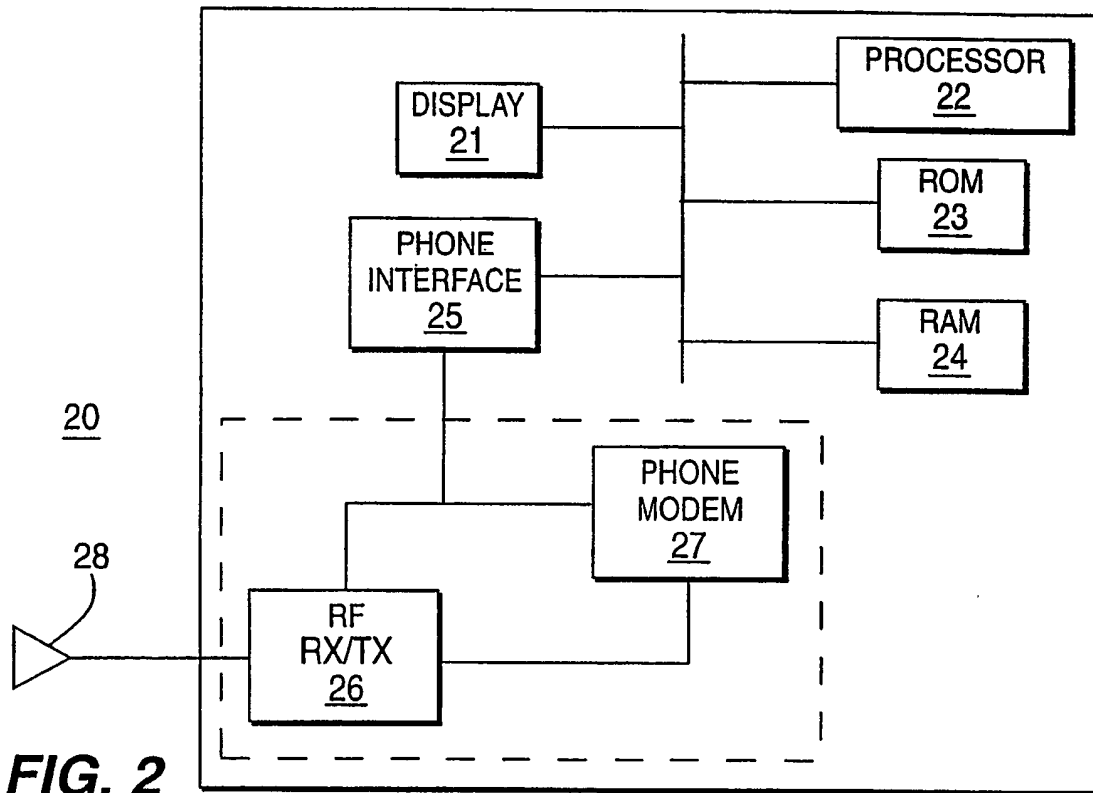


FIG. 2

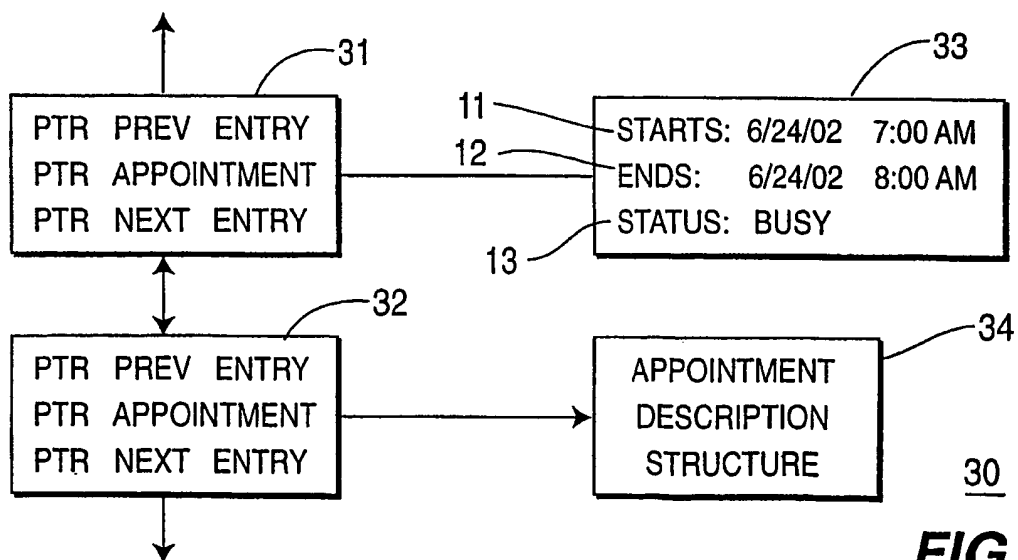
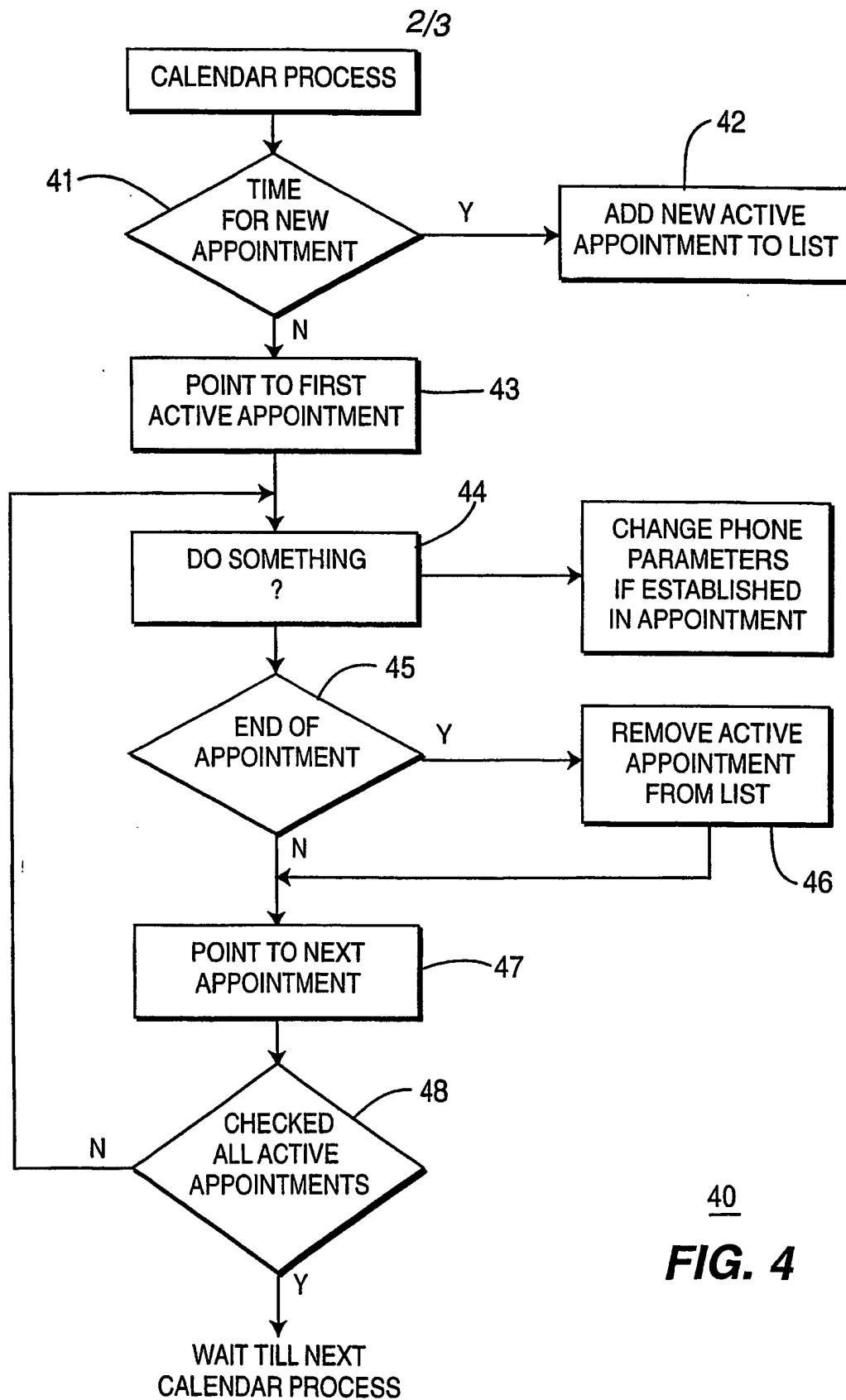
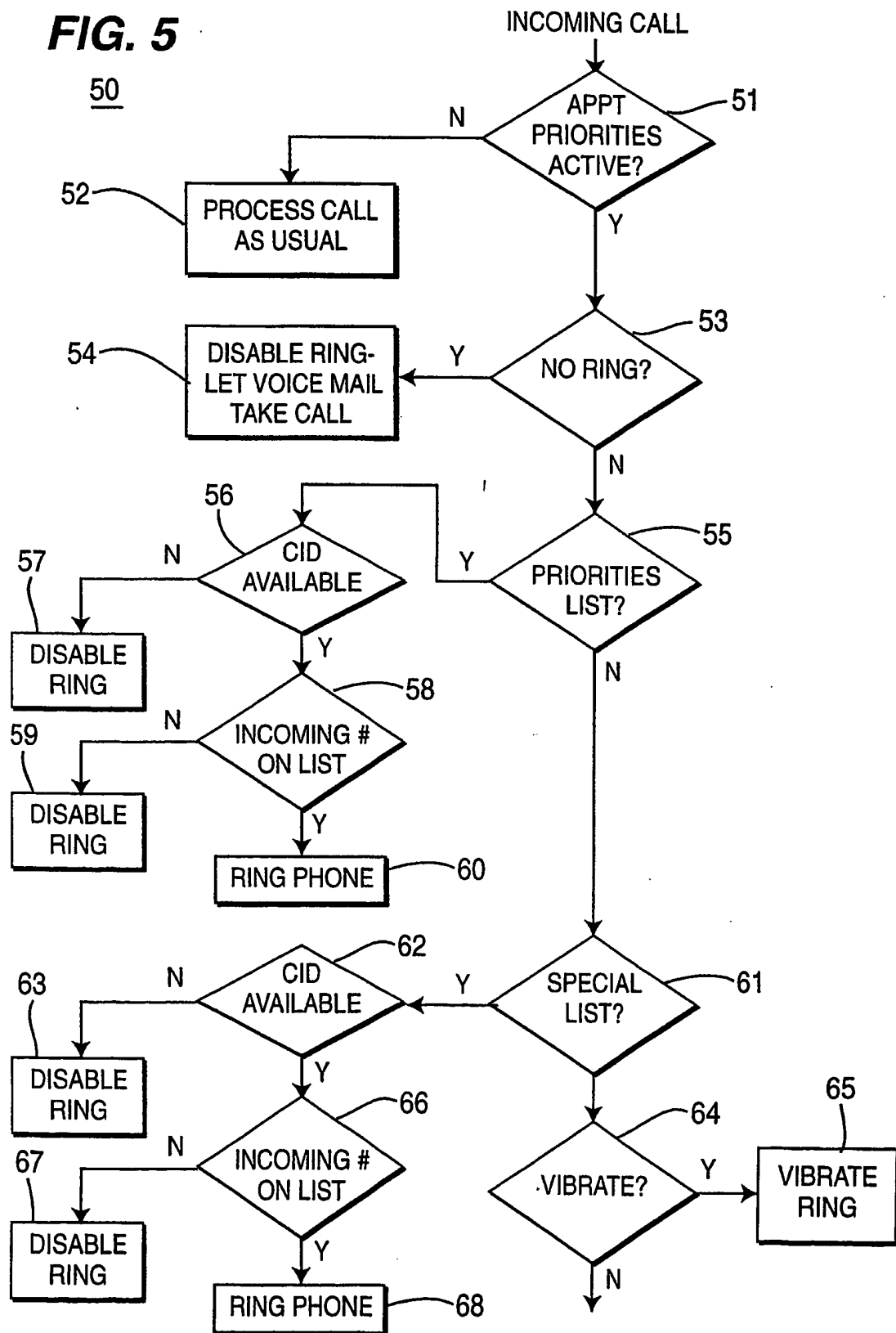


FIG. 3



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FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US03/19938

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H04M 3/42
US CL : 455/456.4, 567

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 455/456.4, 567

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,377,795 B1 [BACH et al] 23 April 2002, col. 3, lines 45-60, col. 1, lines 37-46.	1-10
Y	US 6,163,695 A [TAKEMURA et al] 19 December 2000, col. 5, lines 8-34, col. 10, lines 21-51.	1-10
Y	US 6,122,486 A [TANAKA et al] 19 September 2000, col. 2, lines 41-67.	1-10

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"A" document member of the same patent family
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